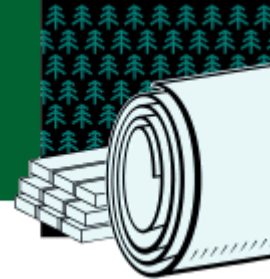


FOREST PRODUCTS

Project Fact Sheet



ENERGY-EFFICIENT KRAFT PULPING FOR HIGHLY BLEACHABLE, LOW-LIGNIN-CONTENT PULP

BENEFITS

- Generates significant energy savings for industry
- Allows the pulp and paper industry to meet environmental regulations on chlorinated effluents
- Raises the bleachability and strength of unbleached pulps
- Integrates the pulping and bleaching processes in the mill
- Decreases production costs for industry
- Improves the competitiveness of U.S. technology and paper products

APPLICATIONS

The advanced control system and the in-situ analytical technology developed in this project will be available to the pulp and paper industry to minimize the environmental impact of bleaching processes.



Advanced Process Will Ensure Environmental Neutrality of Future Pulp Mills

This project will help satisfy two demands that have been placed on kraft pulp mills: to produce easily bleachable kraft pulp of low lignin content, and to develop control strategies to deliver uniform, unbleached pulp from the digester.

During kraft pulping, chemicals are used to remove the lignin that binds the cellulosic fibers of wood. Although maximum retention of cellulose and hemicellulose ensures the highest yield of pulp per unit of wood, there must also be extended delignification to remove residual lignin. Otherwise, the resulting pulp must be bleached with chlorine, which has negative effects on the environment, to achieve the brightness and strength required for many paper products. Work is underway to develop energy-efficient processes for producing low-lignin pulp that can be readily bleached by non-chlorine agents.



Figure 1. This simplified schematic shows the on-line liquor analysis system in the liquor circulation line. In addition to in-situ NIR analysis, two injection valves arranged in series deliver a precise quantity of a sample of cooking liquor to the individual sample loops for analysis.

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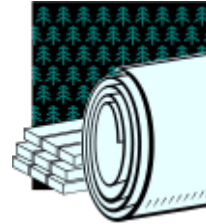
PROJECT DESCRIPTION

Goal: To develop an energy-efficient process to produce strong bleached kraft pulp with minimum impact on the environment through advanced process control.

The research plan consists of three separate efforts : (1) Development of advanced control strategies and algorithms to monitor and control the commercial process in real time; (2) identification of control objectives (i.e., optimized pulping chemical concentration profiles, concentration profiles of reaction products, and temperature histories); and (3) identification and development of process modifications to achieve pulp that is easily bleachable, light in color, and low in its lignin content.

PROGRESS & MILESTONES

- Successful development of NIR sensor models and sampling systems.
- Commercial demonstration of the sensor technology in two mills
- Conditions determined for identification of easily bleachable pulps
- Pulping models and control algorithms developed
- In the coming year, additional NIR sensor systems to be installed at mill sites in cooperation with industry and process to be scaled up for a semi-commercial, large pilot-scale demonstration



PROJECT PARTNERS

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